37. (Amended) The image display apparatus according to claim 35, wherein the at least one electron-emitting device includes a plurality of electron-emitting devices matrix-wired by a plurality of row-directional wirings and a plurality of column-directional wirings.

REMARKS

This application has been reviewed in light of the Office Action dated September 25, 2002. Claims 1-37 remain pending in this application. Claims 1-32 and 35-37 have been amended to define still more clearly what Applicants regard as their invention. Claims 1, 11, and 19 are in independent form. Favorable reconsideration is requested.

Claims 19 - 34 were rejected under 35 U.S.C. § 112, second paragraph, as indefinite. In particular, the Office Action asserts that "[i]t is unclear if the metallic oxide is included as part of the insulating layer, or the 'metallic oxide particle layer' and the 'insulating layer' are two different layers."

Applicants have carefully reviewed and amended independent Claim 19 as deemed necessary to ensure that it conforms fully to the requirements of Section 112, second paragraph, with special attention to the above points raised in the Office Action. Support for the subject matter in Claim 19 of a "metallic oxide particle layer" and an "insulating material film" being two separate layers is provided in the original specification, at least at page 11, line 2 to line 19.

It is believed that the rejection under Section 112, second paragraph, has been obviated, and its withdrawal is therefore respectfully requested.

Claims 1-3, 7, 8, 10, 11, 15, 16, 18, 19, 22, 27, 28, and 30-33 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,066,883 (Yoshioka et al.). Also, Claims 4, 6, 12-14, 17, 20, 21, and 23-26 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Yoshioka et al.* Additionally, Claims 29 and 34 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Yoshioka et al.* in view of U.S. Patent No. 6,420,825 (Shinjo et al.). Claims 35-37 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Shinjo et al.* in view of *Yoshioka et al.*

According to an aspect of the present invention, metallic oxide particles 8 are contained within a first insulating layer 6, which is located between a second insulating layer 7 and a substrate 1 (see e.g., Figs. 1 and 2b). Elements constituting an electron-emitting device are arranged on a surface of the second insulating layer 7. The metallic oxide particles 8 contained within the first insulating layer 6 are not part of those elements of the electron-emitting device. Instead, the first insulating layer 6 and metallic oxide particles 8 constitute part of a substrate structure which in its original form is a precursor to an electron source, and on which the electron-emitting device of the electron source is to be disposed.

Claim 1, as now amended, is directed to a substrate structure which is a precursor to an electron source, and on which an electron-emitting device of the electron source is to be disposed. The structure comprises a substrate and an

insulating material film provided on the substrate. The insulating material film includes a metallic oxide and has a vacancy.

Yoshioka et al. relates to an electron-emitting device which includes a laminate having an insulating layer held between a pair of electrodes opposing each other. An electron-emitting region insulated from the electrodes is formed at a side end surface of the insulating layer formed at a part at which the electrodes oppose each other, and electrons are emitted from the electron-emitting region by applying a voltage between the electrodes.

The Office Action cites *Yoshioka et al.* as disclosing "an electron source forming substrate [4] comprising an insulating material film [11] provided on a substrate surface where an electron-emitting device is arranged, wherein said insulating material film contains a plurality of metallic oxide particles [9] and vacancy [portions around the particles, see figure 1] are provided among said plurality of metallic oxide particles." The Office Action also cites *Yoshioka et al.* as disclosing "wherein said metallic oxide is an electronically conductive oxide, and is SnO2 [column 7, lines 44-59]." The Office Action additionally cites *Yoshioka et al.* as disclosing "wherein the insulating material of said insulating material film is SiO2 or laminated [column 10, lines 42-45] [. . . and] an electron-emitting device comprising a conductive film including an electron-emitting portion [1, 2]."

In *Yoshioka et al.*, the metallic oxide particles 9 are arranged on the surface of, or within, the insulating layer 11, which is located above the substrate 4 (see

column 8, line 30 to column 9, line 31 and Figs. 9-14). The particles 9 and the insulating layer 11 constitute part of the electron-emitting device.

However, while *Yoshioka et al.* may be well-suited for its intended purpose, nothing in that reference would teach or suggest a substrate structure, which is a precursor to an electron source, and on which an electron-emitting device of the electron source is to be disposed, wherein the substrate structure comprises a substrate and an insulating material film provided on the substrate, and wherein the insulating material film includes a metallic oxide and has a vacancy, as recited in Claim 1.

For this reason, Claim 1 is deemed clearly patentable over *Yoshioka et al.*

Claim 19, as now amended, is directed to a substrate structure which is a precursor to an electron source, and on which an electron-emitting device of the electron source is to be disposed. The structure comprises a substrate, a metallic oxide particle layer including a plurality of metallic oxide particles provided on the substrate, and an insulating material film provided on the metallic oxide particle layer. The metallic oxide particle layer has a vacancy.

For the same reasons as those given above, Applicants respectfully submit that *Yoshioka et al.* does not teach or suggest a substrate structure having such features.

Accordingly, Claim 19 also is believed clearly patentable over *Yoshioka et al.*

Amended independent Claim 11 recites features that are similar in many respects to those of Claim 1, and is also believed to be patentable over *Yoshioka et al.*

for at least the same reasons as those discussed above in connection with independent Claim 1.

A review of the other art of record, including *Shinjo et al.*, has not revealed anything which, in Applicants' opinion, would remedy the deficiencies of *Yoshioka et al.* discussed above, as a reference against the independent claims herein. Accordingly, those claims are believed patentable over the art of record.

The other claims in this application are each dependent from Claims 1, 11, or 19 discussed above and are therefore also believed patentable for the same reasons as are those corresponding independent claims.[1] Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of each dependent claim on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and early passage to issue of the present application.

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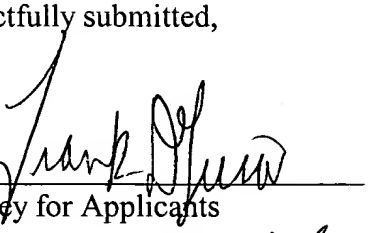
[1] Although Claims 35-37 were rejected over *Shinjo et al.* in view of *Yoshioka et al.*, where *Shinjo et al.* apparently is the primary reference against those claims, Claims 35-37 depend from independent claims which were not rejected over *Shinjo et al.* Accordingly, it is believed the rejection of Claims 35-37 based on the primary reference *Shinjo et al.* is improper without a corresponding rejection of the independent claims based on that same reference. Accordingly, withdrawal of the rejection of Claims 35-37 is respectfully requested.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should be directed to our address listed below.

Respectfully submitted,



Attorney for Applicants

Registration No. 42,476

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-3801
Facsimile: (212) 218-2200

MARKED-UP VERSION SHOWING THE CHANGES MADE TO THE CLAIMS

1. (Amended) A substrate structure which is a precursor to an electron source, and on which an electron-emitting device of the electron source is to be disposed, comprising:

a substrate; and

an insulating material film provided on said substrate,

[An electron source forming substrate comprising an insulating material film provided on a substrate surface where an electron-emitting device is arranged,]

wherein said insulating material film [contains] includes a metallic oxide and has a vacancy.

2. (Amended) The [electron source forming] substrate structure according to claim 1, wherein said metallic oxide is an electronically conductive oxide.

3. (Amended) The [electron source forming] substrate structure according to claim 1, wherein said metallic oxide is SiO_2.

4. (Amended) The [electron source forming] substrate structure according to any one of claims 1 to 3, wherein said insulating material film has a ratio of said vacancy in its cross section within the range of 5% to 10%.

5. (Amended) The [electron source forming] substrate structure according to any one of claims 1 to 3, wherein a thickness of said insulating material film is within the range of 150 nm to 3 μm.

6. (Amended) The [electron source forming] substrate structure according to any one of claims 1 to 3, wherein said insulating material film further contains phosphorus.

7. (Amended) The [electron source forming] substrate structure according to any one of claims 1 to 3, wherein [the] an insulating material of said insulating material film is SiO_2.

8. (Amended) The [electron source forming] substrate structure according to any one of claims 1 to 3, wherein on said insulating material film, a film comprising an insulating material is further laminated.

9. (Amended) The [electron source forming] substrate structure according to claim 8, wherein [the] a thickness of the insulating material film comprising said insulating material is within the range of 20 nm to 3 μm.

10. (Amended) The [electron source forming] substrate structure according to claim 8, wherein said insulating material is SiO_2.

11. (Amended) A substrate structure which is a precursor to an electron source, and on which an electron-emitting device of the electron source is to be disposed, comprising:

a substrate; and

an insulating material film provided on said substrate,

[An electron source forming substrate comprising an insulating material film provided on a substrate surface where a electron emitting device is arranged,]

wherein said insulating material film [contains] includes a plurality of metallic oxide particles and has a vacancy [are] provided among said plurality of metallic oxide particles.

12. (Amended) The [electron source forming] substrate structure according to claim 11, wherein said insulating material film has a ratio of said vacancy in its cross section within the range of 5% to 10%.

13. (Amended) The [electron source forming] substrate structure according to claim 11 or 12, wherein [the] a thickness of said insulating material film is within the range of 150 nm to 3 μm.

14. (Amended) The [electron source forming] substrate structure according to any one of claims 11 or 12, wherein said insulating material film further contains phosphorus.

15. (Amended) The [electron source forming] substrate structure according to any one of claims 11 or 12, wherein [the] an insulating material of said insulating material film is SiO_2.

16. (Amended) The [electron source forming] substrate structure according to any one of claims 11 or 12, wherein on said insulating material film, a film comprising an insulating material is further laminated.

17. (Amended) The [electron source forming] substrate structure according to claim 16, wherein [the] a thickness of the insulating material film made of said insulating material is within the range of 20 nm to 3 μm.

18. (Amended) The [electron source forming] substrate structure according to claim 16, wherein said insulating material is SiO_2.

19. (Amended) A substrate structure which is a precursor to an electron source, and on which an electron-emitting device of the electron source is to be disposed, comprising:

a substrate;

a metallic oxide particle layer including a plurality of metallic oxide particles provided on said substrate; and

an insulating material film provided on said metallic oxide particle layer,

wherein said metallic oxide particle layer has a vacancy.

[An electron source forming substrate comprising an insulating material film provided on a substrate surface where an electron emitting device is arranged, wherein said insulating material film contains a plurality of metallic oxide particles, said plurality of the contained metallic oxide particles form a metallic oxide particle layer between said substrate surface and said insulating material film surface in said insulating material film, and vacancy is provided in said metallic oxide particle layer.]

20. (Amended) The [electron source forming] substrate structure according to claim 19, wherein said metallic oxide[s] particle layer has a ratio of said vacancy in its cross section within the range of 5% to 10%.

21. (Amended) The [electron source forming] substrate structure according to claim 19 or 20, wherein said insulating material film further contains phosphorus.

22. (Amended) The [electron source forming] substrate structure according to claim 19 or 20, wherein [the] an insulating material of said insulating material film is SiO_2.

23. (Amended) The [electron source forming] substrate structure according to claim 11 or 19, wherein [the] an average particle size of said plurality of metallic oxide particles is within the range of 6 nm to 60 nm.

24. (Amended) The [electron source forming] substrate structure according to claim 11 or 19, wherein [the] an average particle size of said plurality of metallic oxide particles is within the range of 6 nm to 20 nm.

25. (Amended) The [electron source forming] substrate structure according to claim 11 or 19, wherein the size of said vacancy is within the range of 0.1 to 5 times [the] an average particle size of said plurality of metallic oxide particles.

26. (Amended) The [electron source forming] substrate structure according to claim 11 or 19, wherein the size of said vacancy is within the range of 0.1 to 2 times [the] an average particle size of said plurality of metallic oxide particles.

27. (Amended) The [electron source] substrate structure according to claim 11 or 19, wherein said metallic oxide particles are electronically conductive particles.

28. (Amended) The [electron source forming] substrate structure according to claim 11 or 19, wherein said metallic oxide particles are particles of SnO_2.

29. (Amended) The [electron source forming] substrate structure according to any one of claims 1, 11 or 19, wherein said substrate is a substrate containing sodium.

30. (Amended) The [electron source forming] substrate structure according to claim 29, wherein said insulating material film is a sodium blocking film.

31. (Amended) The [electron source forming] substrate structure according to any one of claims 1, 11 or 19, wherein said insulating material film is a antistatic film.

32. (Amended) An electron source, comprising a substrate and an electron-emitting device arranged on said substrate, wherein said substrate is the substrate structure according to any one of claims 1, 11 or 19.

35. (Amended) An image display apparatus comprising [an] at least one electron-emitting device, an image display member for displaying images by irradiation of at least one electron from said electron-emitting device, and an envelope in which said electron-emitting device and said image display member are arranged, wherein a substrate where said electron-emitting device is arranged [are] is a substrate structure according to any one of claims 1, 11 or 19.

36. (Amended) The image display apparatus according to claim 35, wherein said electron-emitting device[s] [are electron-emitting devices] is an electron-

emitting device comprising a[n] conductive film containing [the] an electron-emitting portion.

37. (Amended) The image display apparatus according to claim 35, wherein the at least one electron-emitting device includes a plurality of [said] electron-emitting devices [are] matrix-wired by a plurality of row-directional wirings and a plurality of column-directional wirings.

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